DOCUMENT RESUME

ED 239 062 CE 037 887

TITLE	Emergency Victim Care. A Training Manual for Emergency Medical Technicians. Module 9. Backboards/Moving and Handling the Victim, Fractures, Dislocations. Revised.
INSTITUTION	Ohio State Dept. of Education, Columbus. Div. of Vocational Education.
PUB DATE	83
NOTE	55p.; For related documents, see CE 037 879-892.
AVAILABLE FROM	Vocational Instructional Materials Laboratory, Ohio State University, 154 W. Twelfth Avenue, Columbus, OH 43210.
PUB TYPE	Guides - Classroom Use - Materials (For Learner) (051)
EDRS PRICE	MF01/PC03 Plus Postage.
DESCRIPTORS	*Accidents; *Allied Health Occupations Education; Behavioral Objectives; *Emergency Medical Technicians; *First Aid; *Injuries; Job Skills; Postsecondary Education; Rescue; Textbooks; Vocational Education
IDENTIFIERS	Ambulance Equipment; Emergency Medical Services

ABSTRACT

This training manual for emergency medical technicians, one of 14 modules that comprise the Emergency Victim Care textbook, covers backboard moving and handling victims, fractures, and dislocations. Objectives stated for the three chapters are for the student to be able to describe: procedures to use the backboard, stair chair, Stokes basket, and scoop stretcher; procedures to move a victim from bed or couch; various drags and carries; techniques used in immobilizing possible fractures; various types of splinting materials; causes, signs, and symptoms for dislocations; and emergency treatment for dislocations. Informative material is provided on logrolling, handling of backboards, rolling victim 180 degrees, moving and handling the victim, carries and drags, fractures, immobilization equipment and material, blanketroll splints, specific fractures, and dislocations. (YLB)

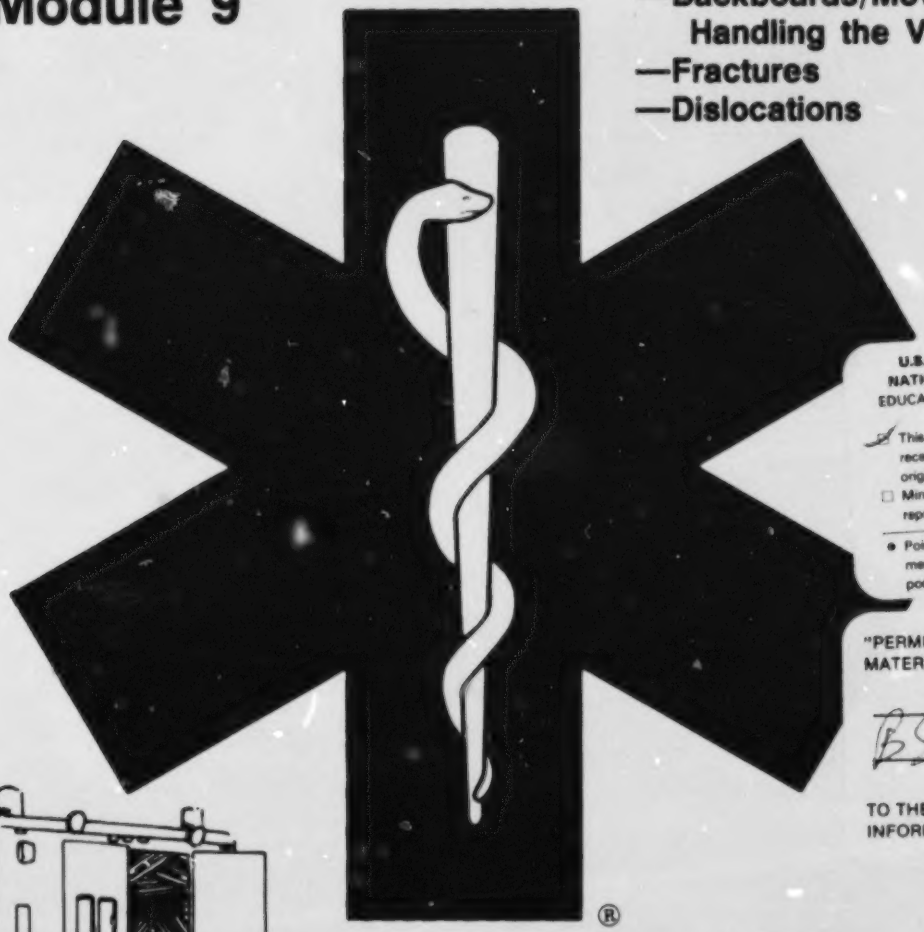
****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

EMERGENCY VICTIM CARE

Module 9

—Backboards/Moving and Handling the Victim
—Fractures
—Dislocations

ED239062



U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

B Stevenson

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

CE037887

OHIO TRADE AND INDUSTRIAL EDUCATION SERVICE

Division of Vocational Education
State Department of Education
Columbus, Ohio

Copyright — 1976

Trade and Industrial Education Service

Edited and distributed by the:
Instructional Materials Laboratory
Trade and Industrial Education
The Ohio State University
College of Education
Columbus, Ohio 43210

Revised 1983

This text is intended for use as a learning aid and to excite your curiosity and eagerness to serve patients. This text is not exhaustive and the opinions and directory comments will change from time to time as new procedures and laws become effective.

The Ohio Department of Education insures equal employment and equal educational opportunities regardless of race, color, creed, national origin, handicap, sex or in compliance with state directives and federal recommendations.

EMERGENCY VICTIM CARE

A TRAINING MANUAL FOR EMERGENCY MEDICAL TECHNICIANS

OHIO TRADE AND INDUSTRIAL EDUCATION SERVICE

DIVISION OF VOCATIONAL EDUCATION
STATE DEPARTMENT OF EDUCATION
COLUMBUS, OHIO

TO THE LEARNER

The 1983 Emergency Victim Care textbook revision has been grouped into 14 modules. The modules have been grouped by content matter as follows:

Module 1

Preface
Foreword
Acknowledgment
Student-Instructor Relationship

Personnel
Emergency Medical Service Vehicles
EMS Communication
Records and Reports

Module 2

Equipment
Safe Driving Practices
Legal Aspects
Controlling the Situation
Action Evaluation Conference

Module 3

Anatomy & Physiology

Module 4

Vital Signs
Patient Assessment

Module 5

Cardiopulmonary Resuscitation (CPR)

Module 6

Bleeding Control
Wounds and Bandaging
Shock

Module 7

Medical Emergencies

Module 8

Crisis Intervention
Drug-Related Problems

Module 9

Backboards/Moving and Handling the Victim
Fractures
Dislocations

Module 10

Injuries of the Eye, Ear, Nose, Abdomen, C.N.S. and Genitalia
Burns and Environmental Injuries

Module 11

Childbirth
Pediatric Emergency

Module 12

Water Accidents
Electrical Emergencies
Hazardous Materials and Radiation Accidents

Module 13

Extrication from Automobiles

Module 14

Appendix I: Communicating with Deaf and Hearing Impaired Patients
Appendix II: Medical Terminology
Appendix III: EMS Organizations
Appendix IV: Legislation
Glossary of Terms
Index

MODULE 9

TABLE OF CONTENTS

Backboards/Moving and Handling the Victim 1

Fractures 25

Dislocations 47

BACKBOARDS/MOVING AND HANDLING THE VICTIM

OBJECTIVES

Upon completion of the following chapter, you will be able to:

—explain procedures to use the backboard, stair chair, Stokes basket and scoop stretcher.
—describe procedures used to move a victim from a bed or couch.
—describe the various drags and carries used in moving and handling a victim.

Following instruction and/or practice you will be able to:

—demonstrate procedures on how to use the backboard, stair chair, Stokes basket and scoop stretcher.
—demonstrate procedures to move a victim from a bed or couch.
—demonstrate the different drags and carries used to move and handle a victim.

INTRODUCTION

The backboard is a versatile tool. Its primary purpose is to immobilize fractures of the neck and back. But this rigid board is also ideal for moving victims of other conditions such as fractures of the pelvis or both legs.

Carrying a large, unconscious patient down three flights of stairs is a difficult task. Strapping the patient securely to a backboard makes the job much easier.

After using the backboard for a short time, EMTs will recognize many other types of situations in which it is useful.

Victims should be moved onto a backboard by the method known as "logrolling."

LOGROLLING

DEFINITION

Logrolling is the turning of a victim's body by several people working in unison. Its purpose is to protect a victim who must be moved onto (or off of) a backboard or stretcher, when the victim's back or neck may be injured.

This procedure has been used for many years in hospitals. It should **always** be used by EMTs on accident victims with suspected neck and back injuries.

Logrolling is also a wise practice whenever EMTs are preparing to transport an unconscious victim.

Figures 1 through 12 show logrolling procedures. The positions of the EMTs' hands should always be, as nearly as possible, like those shown in the illustrations. When a victim is to be removed from a car or truck, these same hand positions can be used.

After emergency care, when you are ready to move the victim onto a backboard, establish on which side the victim is to be rolled; it should be the least injured or non-injured side. Next raise the victim's arm, on the side onto which the victim is to be rolled, above the head. See Figure 1.

POSITION OF HANDS

The exact position of each EMT's hands on the victim is very important in logrolling.

Figure 1. Raising the victim's arm prior to rolling. In this case the victim will be rolled onto right side.

1. **The top EMT's** top hand is to be under the neck, supporting the head. The bottom hand grasps the clothing (or skin) at the shoulder. See Figure 2.

2. **The center EMT's** top hand is to be around the victim's distant arm and grasping the clothing. The bottom hand grasps the clothing at the belt region.

3. **The bottom EMT's** top hand grasps the victim at the hip region. The bottom hand grasps the distant leg at the calf.

ROLL

At a signal from the top EMT, all three roll the victim toward them. See Figure 3. Note that four of the six hands of the EMTs are grasping the trunk of the victim's body. Also note that the victim's head is supported by the top EMT. All EMTs should be on the same knee.

Figure 2

Figure 3

Figure 2 shows the location of each EMT's hands on the victim before logrolling. In Figure 3 the victim has been logrolled on side.

PLACING THE BOARD

While the victim is held on the side, the board is placed flat on the ground or floor next to the victim. See Figure 4.

Again on a signal from the top EMT, the victim is lowered on the board. The victim's arm is returned to the side.

SLIDING THE VICTIM

The victim usually is centered when placed on the board. If not centered on the board, the victim can be slid over by the rescue team, working in unison. While the EMT who placed the board holds it, the other three EMT's remain where they were and place their hands on the victim's body, in the same positions, **but** on the opposite side. See Figure 5.

At the signal from the top EMT, the victim is slid over with a gentle, **even** motion.

Figure 4

Figure 5

A backboard is placed behind the victim (Figure 4). After being lowered onto the board, the victim can be slid gently toward the center if necessary; however, this must also be done in unison (Figure 5).

BOARD WITH FOOTREST

If it is determined a footrest will be needed on the backboard, insert it prior to logrolling the victim.

The EMT who will place the board should measure the board by placing the board and footrest as shown in Figure 5, View A. The board is then placed on the floor and the victim is logrolled as previously described. See Figure 6, View B.

View A

View B

Figure 6. Using board with footrest

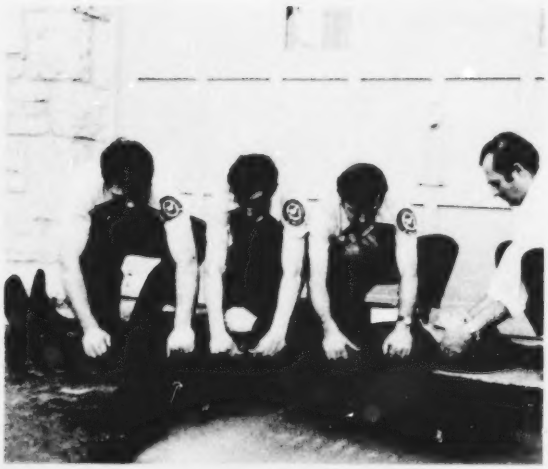


Figure 7

Figure 8

Four EMTs logroll a suspected neck injury victim

POSSIBLE NECK INJURY

If a neck injury is suspected, one EMT must attend the head and neck at all times until it is immobilized.

Figures 7 and 8 show the proper way to logroll a victim with a neck injury.

Note that the EMT caring for the neck is applying slight traction, supporting the chin and keeping the nose in line with the "belly button" at all times. Also note that the EMT at the shoulder uses only one hand during this procedure. The EMT caring for the neck should give all signals. The victim's neck should then be immobilized with a blanket-roll splint.

Figure 9

Figure 10

EMTs' hands are placed for logrolling a victim face down (Figure 9). Then the victim is rolled on side (Figure 10).

ROLLING VICTIM FACE DOWN

When a victim is found face down and needs to remain that way (severe bleeding at the face, secretions and mucus from the mouth, vomiting, etc.), the procedure for transport is much the same.

Figure 9 shows the placement of the hands for this procedure.

Figure 10 shows the placing of the board.

Figure 11 shows the victim, face down on the board.

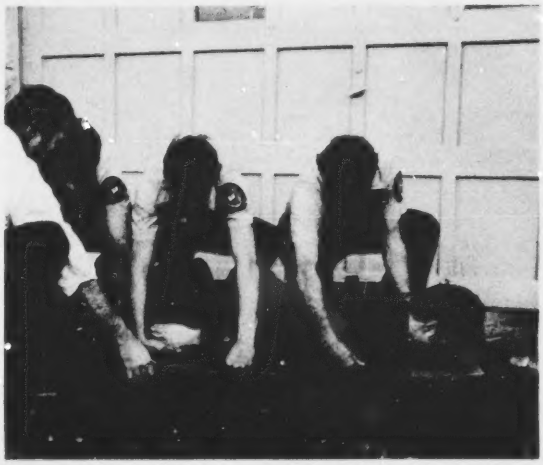


Figure 11. After lowered to a facedown position, the victim can be slid glently to the center of the board.

HANDLING OF BACKBOARDS

The following series of pictures (Figures 12 through 20) illustrates how to use backboards.

Specifications for two backboards, child and adult sizes, can be found in this manual.

STRAPPING A VICTIM TO A BOARD

If a victim must be carried for some distance on a backboard, straps should be used.

Placing Straps—The positions of the three straps on the victim are most important.

1. The **bottom strap** must be placed around the board and around the victim just above the knees. If victim is in the prone position, face down, the bottom strap should be placed just below the knees. This will prevent the victim from raising the legs off the board.

2. The **middle strap** must be placed around the board, and across the victim's hip region. The victim's hands should be at the sides with the strap passed over the wrists.

3. The **top strap** must be placed around the board and across the victim's chest region, just below the shoulders.

All three of these strap positions can be seen in Figure 12. Note the straps **do not go** through the holes in the board, but around the board. The straps would not be located properly if they were put through the board holes.

Securing Feet and Head—If the victim must be carried up or down any distance, a footrest must be put in place and the feet must be tied to it with a cravat. The victim's head can be kept secure with a cravat.

Figure 12

Figure 13

Figure 12 shows proper strap placement. The bottom strap passes just above the knees; the middle strap passes across the hips and over the wrists; the top strap passes across the upper chest. Figure 13 shows feet secured to footrest.

ROLLING VICTIM 180°

Rolling a victim 180° is seldom necessary. However, there are occasions when it becomes necessary to properly treat a victim.

When rolling a victim 180°, the board is placed between the victim and the EMTs. The EMTs kneel on the board and roll the victim onto side. Holding the victim in this position, the EMTs move off the board and then, with one hand remaining in place, grasp the victim's clothes and place the other hand under the victim for support, continuing to roll the victim onto the board.

Figure 14. Board is set beside victim. EMT lines up hands for proper head and neck support.

Figure 15. EMTs kneel on board to begin maneuver. EMT at head has hands crossed.

Figure 16. Victim is supported on side as EMTs slide off board.

Figure 17. EMTs place one hand on back of victim and keep the other grasping the clothing as victim is lowered to board.

The EMT who is controlling the head should be positioned midway between victim and board. This EMT should start the maneuver with hands crossed so that at the end of the maneuver the hands will be in the proper position. See Figures 14 through 17.

RAISING THE BOARD

To raise a backboard, one EMT places four fingers of one hand into the handhold in the bottom on the board, lifts the board and places it on one foot. See Figure 18.

Then the EMT takes hold of the board with both hands, bends the knees, and lifts with the legs, **not** the back. The EMT lifts the board just to the knees. See Figure 19.

Figure 18. Squadperson places board on foot

The top EMT is positioned at the top of the board, then stoops, places each hand on one edge of the board, and slides hands along the board toward self until touching the ground. See Figure 19.

The EMT then straightens the legs and lifts with the leg muscles, not the back. If both EMTs keep their arms straight, the board can be carried easily. See Figure 20. EMTs should not bend their arms while carrying a patient on a backboard, as it is very tiring.

Vertical Position—If carried in a vertical position, the victim must be raised properly with the feet secured to a footrest.

1. After the board is lifted to the normal (horizontal) carrying position, the foot end of the board is lowered again.

2. Two EMTs then "foot" the board; that is, each braces it with a foot.

3. The top EMT then raises the board to the chest, places it on the chest, changes the direction of the hand position, and pushes away.

4. The bottom two EMTs then receive the board. See Figure 21.

The victim who is properly secured to a backboard can be safely raised to a vertical position using this procedure. The victim will not slide off or fall away from the board.

Figure 19

Figure 20

Figure 19 shows the proper first step in raising the board. Figure 20 shows the proper way to carry the board.

Figure 21. EMTs raise the victim to a vertical position

MOVING AND HANDLING THE VICTIM

INTRODUCTION

After emergency care and life support measures have been provided, the victim must be moved to the emergency vehicle for transport to a medical facility. Proper movement and handling will prevent aggravation of the victim's condition and will provide the greatest degree of comfort to the victim and the emergency personnel.

The location, environment, and the victim's condition will dictate the method and equipment to be used. The emergency personnel must **sizeup the situation,** exercise **initiative,** rely on **past experiences,** and use **common sense** in every case before moving the victim.

(In many of the following procedures assistance from family members or bystanders must be secured to place and position backboards and cots, and to assist in lifting the victim. They must be instructed in "what to do," and "to do it" only when directed by the EMT in charge.)

FROM A BED

In many of the EMT's runs to a residence, the victim will be found in bed. The following procedures have proven to be very effective, especially when moving those who are seriously ill, aged, or very large. See Figures 22 through 25.

FROM A COUCH

It is not uncommon to enter a residence and find the victim on a couch or daybed. To lift the victim from the couch, use the three-person raise. Making sure the area behind you is clear, lift the victim to your standing position and take two steps backward. The cot is then moved in between the EMTs and the couch and directly under the victim. Lower the victim to the cot. See Figures 26 through 28.

Figure 22. The victim is logrolled onto side and the backboard is placed in position.

Figure 23. The victim is lowered onto the board. By sliding the board the victim can be moved to any position with ease.

Figure 24. The ambulance cot could not be taken to the bedroom because of a narrow hallway that ended with the bedroom door at a right angle. While on the backboard, the victim is easily moved through the door and hall.

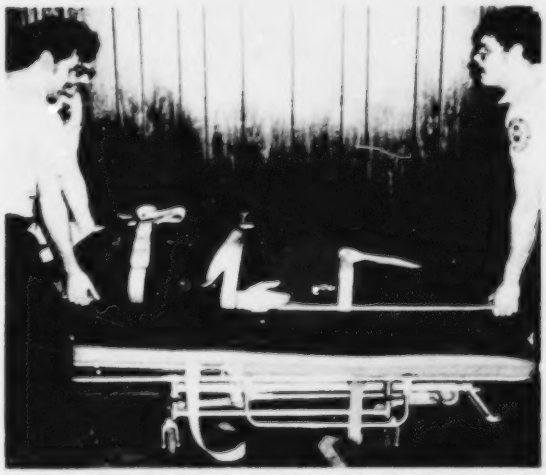


Figure 25. The cot is placed at the hallway exit to accept the victim on the backboard. The board may be left in place or removed depending upon the victim's condition and/or comfort.

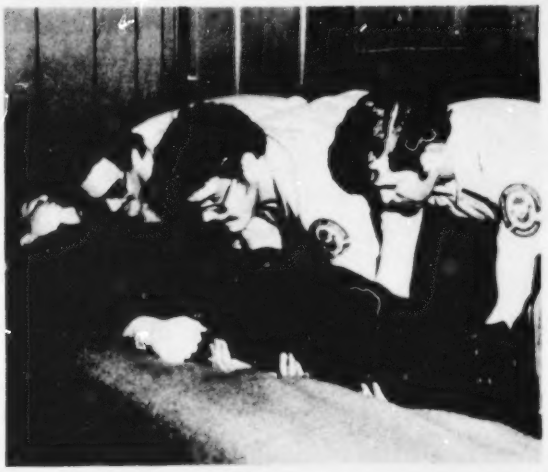


Figure 26. Clear the area behind you of coffee tables, chairs, etc. Prepare to lift the victim using the three-person raise.

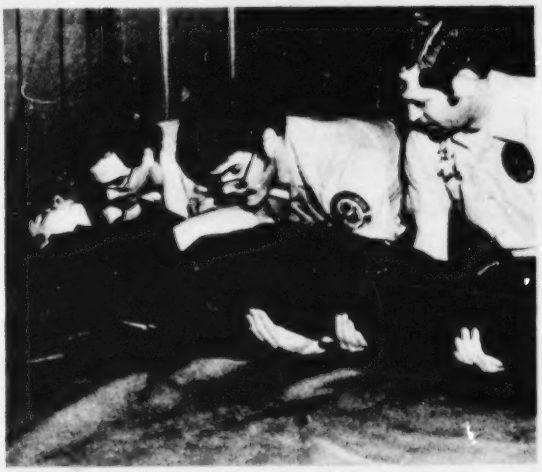


Figure 27. The victim is lifted from the couch and raised in unison.

THE STAIR CHAIR

A stair chair (see Figure 29) can be used where conventional stretchers and cots cannot be maneuvered. It will permit comfortable movement of a victim down a stairway, narrow hallway, and other close quarters.

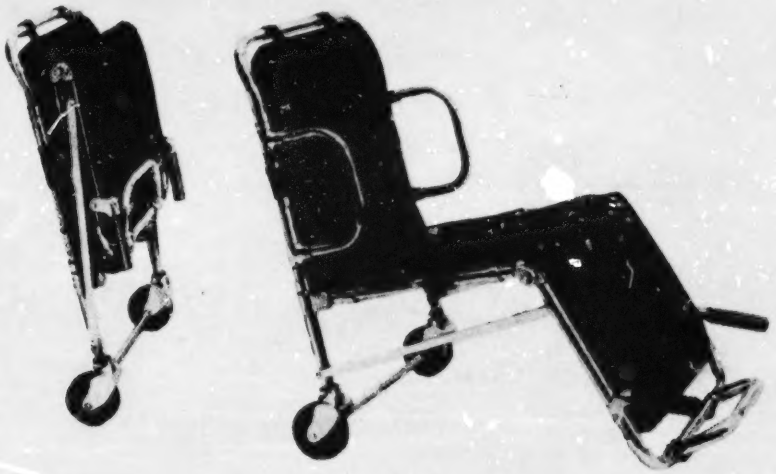
Figures 30 and 31 show the stair chair in use to move a victim from the upper floor, down a narrow stairway, out the front door, to the vehicle.

THE STOKES BASKET

For difficult terrain or removal from heights or over debris, probably no litter can replace the conventional Stokes basket that has been used for many years by the military services, especially by the Navy and the Coast Guard. Until recently the Stokes basket consisted of a metal frame with chicken wire lining, constructed with a divider which separated the legs. It has now been redesigned as an oblong plastic shell with no leg divider. See Figure 32.

One of the difficulties in using the basket stretcher is removing the patient from the basket on delivery to the emergency department, as the patient at times becomes wedged in place. This problem can be overcome by lining the basket with a blanket. The patient is then removed by grasping the rolled-up blanket on either side and lifting.

Figure 28. The cot has been moved in next to the couch and directly under the victim. Gently lower the victim to the cot.



Folded for compact storage. *Opened position ready for use.*

Courtesy: Ferno-Washington, Inc.

Figure 29. The stair chair

Figure 30. The victim is moved down the stairway. Note third person giving added support to EMT.

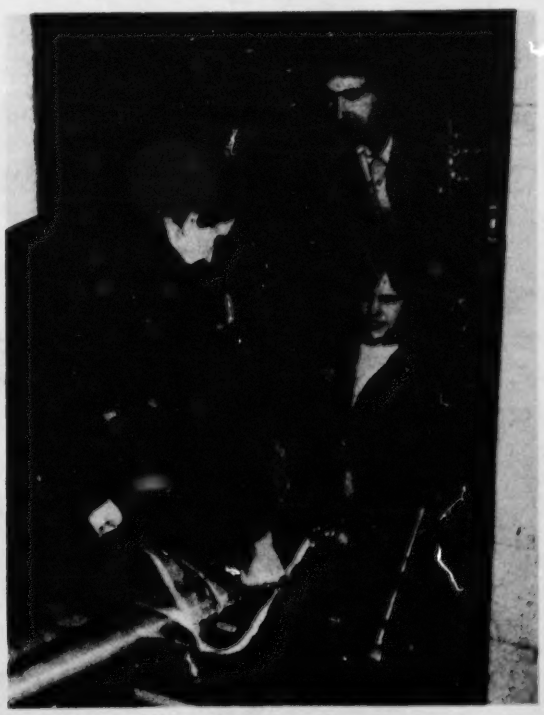


Figure 31. The chair is being gently rolled out the door.

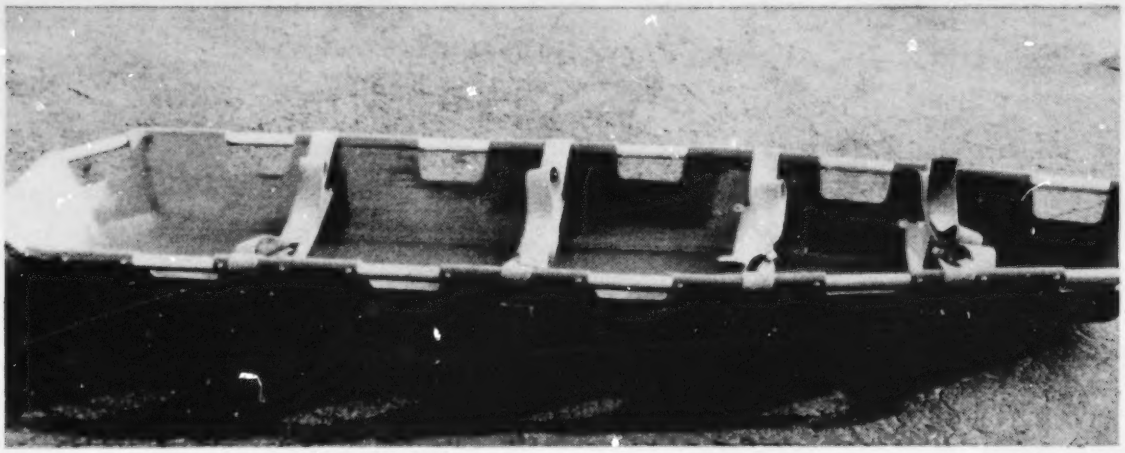
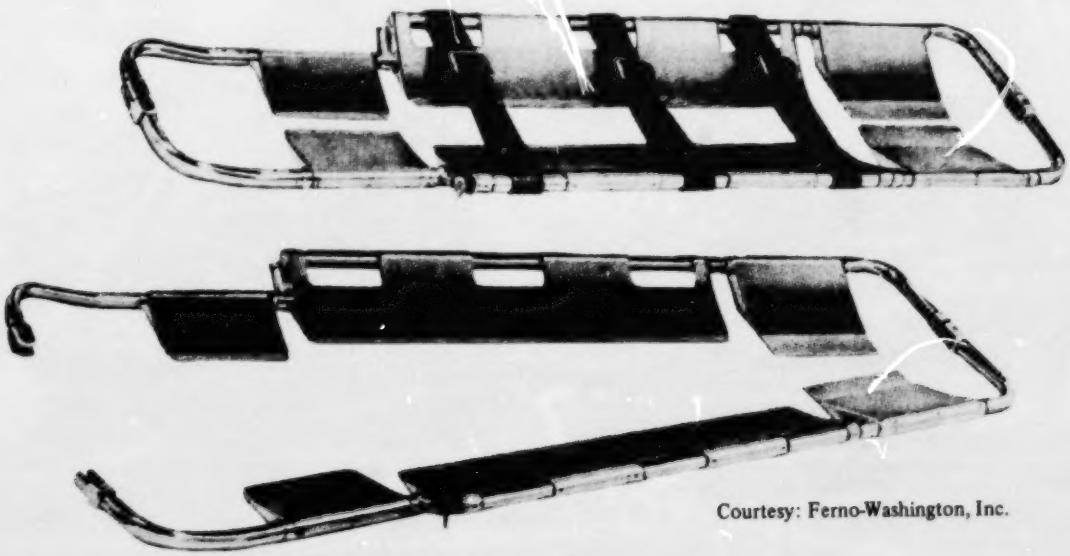


Figure 32. Stokes basket

THE SCOOP STRETCHER

The scoop stretcher permits the picking up of a victim in the position found, providing the area around the victim is clear and free of obstructions. See Figure 33. Either or both ends of the stretcher uncouple to provide easy placement but care must be taken when securing the stretcher that parts of the victim's body are not "pinched." To avoid pinching, it may be necessary to lift or roll the victim **slightly** to permit total placement of the sides of the scoop.

Figures 34 through 36 show the scoop stretcher in use to lift and move a man who was struck by an auto.



Courtesy: Ferno-Washington, Inc.

Figure 33. The scoop stretcher

Figure 34. The EMTs have provided all necessary emergency care. A back injury was suspected, and the open area around the victim permitted use of the scoop stretcher.

Figure 35. The victim is strapped to the scoop stretcher in the same manner as on a backboard. The scoop stretcher is lifted and carried in the same manner as the backboard.

Figure 36. After the stretcher is laid on the cot, the stretcher and victim are strapped to the cot before the cot is loaded into the emergency vehicle.

CARRIES AND DRAGS

INTRODUCTION

An important aspect of emergency care is the successful removal of victims in situations where a stretcher or backboard cannot be used. EMTs must be able to carry and drag victims quickly to safety in a variety of emergency situations, with minimum risk to the victims and to themselves. They must be prepared to rescue people who are injured or unconscious when the threat of an impending danger exists.

Persons who have been subjected to intense heat, heavy smoke, gases, or falling materials may become injured or unconscious. EMTs should know the methods for carrying and dragging people to safety in such emergencies. Some common methods are described here.

Chair Carry—This is a good method. It is even better than a stretcher in places where sharp turns must be made or where steep stairways are encountered. The chair should be tested before use to make sure it is solid and will support the victim. After the victim is placed in the chair, the EMT in the rear tilts the chair back to enable the EMT in front to get into position. Carry as shown in Figure 37.

Figure 37. Chair carry

Firefighter's Carry—To get the victim on the shoulder for this carry, balance and coordination of movement are very important. With this method, the EMT can raise any victim the EMT is able to carry. The EMT places the victim backside down, knees up, and feet against buttocks, as shown in Figure 38A.

The EMT then grasps the victim's wrists with the palms down. See Figure 38B.

The rescuer's feet and legs are placed against the victim's feet and legs, as shown in Figure 38C. Then, by leaning back and pulling the victim forward and up at the same time, the EMT enables the victim to fall across the rescuer's shoulder. See Figures 38D and 38E.

Figure 38A

Carrying in Arms—To carry a patient in the arms, the EMT lifts the victim, if unconscious, to an erect position as described in the

Figure 38B

Figure 38C

Firefighter's carry

firefighter's carry. The EMT then supports the patient with one arm about the body. Then, kneeling on one knee, the victim rests on the EMT's other knee. The EMT's other arm is passed under the thighs. The patient is rolled into the hollow of the elbows and raised. See Figure 39.

Figure 38D

Figure 38E

Firefighter's carry

Carrying Astride Back—Carrying astride the back is a comfortable one-person method of transportation, but is limited to carrying a conscious victim who can at least partially stand alone. The rescuer assists the victim to a standing position. Standing in front of the victim, the EMT's back is turned on the victim and the EMT takes the victim's arms over the shoulders and crosses them. The EMT then bends forward until the victim rests on the EMT's back. The EMT grasps each thigh and, with a

Figure 39. Carrying in arms

humping motion, raises the victim well upon the EMT's back. Passing the forearms under the victim's legs, the rescuer then takes a wrist in either hand and the victim is loaded. This carry is so secure that the victim may become unconscious and yet be carried safely and easily. See Figure 40.

Figure 40. Carrying astride back

Pack Strap Carry—The pack strap method is a one-person carry that has two applications, one for a conscious and one for an unconscious victim. For a conscious victim, the loading is done exactly as described in the first part of the "astride back" method. See Figure 41A. When the victim is on the rescuer's back, the rescuer grasps the victim's crossed arms at the wrist, bends forward, humping the victim well up on the EMT's back and proceeds in the manner shown in the illustration. Note that the rescuer has one hand free.

Figure 41A

Figure 41B

Pack strap carry (conscious and unconscious)

If the victim is unconsious, the loading is more difficult, likewise the carry. To make the carry, an improvised "pack strap" is used. The carry gets its name from the pack strap used. The pack strap consists of a loop of some type of material. A rope hose tool is excellent for this purpose, but a bed sheet or any other similar material may be used. The rescuer places the victim supine and passes the loop around and under the shoulders at the armpits. The EMT's body is then placed on that of the victim's, face up, slipping each arm through an end of the loop. The rescuer and the victim roll over. The rescuer then kneels, then rises from a squatting position to an erect position. See Figure 41B. Since both hands are free, the rescuer may proceed down a ladder or through difficult passages. Although the dangling legs of the victim are awkward, the victim cannot slip from the load. Also, the rescuer can shift the load from the back to leg muscles by bending forward.

Front Piggy Back—This one-person carry is excellent for carrying a conscious victim. To

Figure 42. Front piggy back

get the victim in position, the EMT faces the victim. The rescuer's hands are then placed under the victim's armpits. As the victim jumps and puts the legs around the EMT's midriff, above the hips, the EMT should lift the victim. The victim's arms are then wrapped around the rescuer's neck. The rescuer has both hands free to climb or descend a ladder, open a door, etc. If trouble develops while descending a ladder, the rescuer can pin the victim against the ladder until help arrives or until the trouble is eliminated. See Figure 42.

Two-Person Seat Carry—The seat carry seen in Figures 43A and 43B is a two-person means of carrying an injured or unconscious person. It consists of making a seatrest of one pair of arms and a backrest of the other pair. Figure 43A shows how the arms are arranged when completed. The rescuers kneel, one on either side of the victim near the hips, and raise the victim to a sitting position, steadying the victim with the arm nearest the victim's head around the neck.

The EMTs then slips their other arms under the victim's thighs, clasping the wrist of the other rescuer. Both arise slowly, in unison, lifting the victim from the ground. When erect, they adjust their upper arms to form a comfortable backrest and to make the victim secure. See Figure 43B. If conscious, the victim assists the rescuers by grasping them around the necks with either or both arms.

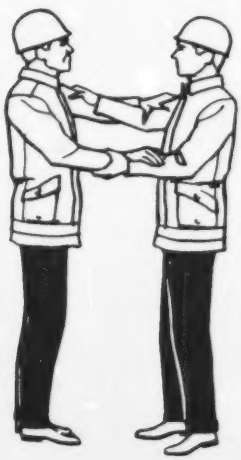


Figure 43A

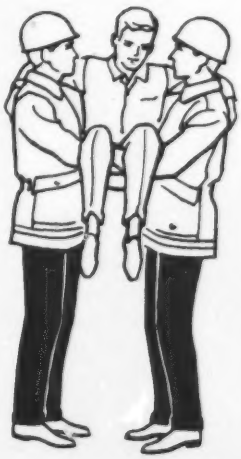


Figure 43B

Two-person seat carry

Carrying By the Extremities—This is a good method, but should not be used if the victim has any fractures. The victim is laid straight on the back, feet apart. One rescuer stands between the victim's legs and the other at the head, facing each other. The rescuer at the victim's feet turns both hands palms down, grasps the victim's wrists, and pulls the victim to a sitting position. The EMT at the victim's head assists in raising the victim to a sitting position by lifting the shoulders. See Figure 44A.

Figure 44A

The rescuer at the head position kneels on one knee and supports the victim's back with the opposite knee and leg. Then the EMT's hands are extended, palms down, under the victim's armpits from back to front. The rescuer at the victim's feet, who has been holding the victim's wrists, places them in the extended hands of the other rescuer, who grasps them firmly. See Figure 44B.

Figure 44B

The rescuer at the victim's feet turns backward to the victim, kneels on one knee, and passes the hands under the victim's knees from the outside. The rescuer at the head position gets into a baseball catcher's position, keeping the back vertical. At the order "raise," by either of the two rescuers, both raise by straightening their legs and move forward. See Figure 44C.

Figure 44C

Carrying by the extremities

Three-Person Carry—The three-person carry is used for badly injured persons. See Figures 45A, 45B and 45C. The carry is accomplished as follows. Three EMTs line up on one side of the victim and the leader gives the command, "Prepare to lift." Each EMT kneels on the knee nearest the victim's feet, so that one EMT is at the victim's shoulders, hips, and one at the knees. Without further orders, the EMTs pass their hands and forearms under the victim, as shown in Figure 45A. The hands of the EMT positioned at the head of the victim are placed under the victim's neck and back, the second under the pelvis and hips, and the third under the knees and ankles. At the command, "Lift," the victim is raised and placed on the knees of the EMTs. The EMTs do not release their hands. See Figure 45B.

At the command, "Prepare to raise," the EMTs slowly turn the victim onto side, toward them until the victim rests in the bend of their elbows. At the command, "Raise," all EMTs rise to a standing position, holding the victim against their chests, as in Figure 45C. To move directly forward, the command, "March," is given and all three EMTs step off on the left foot and continue until the command, "Halt," is given. To move sideways, the command, "Side step left," (or "Side step right,") is given. The rescuers step off with the foot according to the command, bringing the other foot up to it in even, short steps. The victim is then lowered by reversing the operations but always at the command of the leader.

In actual practice, however, it should not be necessary to give detailed commands. The EMTs should be so well trained, they can move and act in unison with a minimum of commands.

Figure 45A

Figure 45B

Figure 45C

Three-person carry

Clothes Drag—When an EMT must rescue a victim who is too heavy to be carried, other means must be used to get the victim to safety. The clothes drag, Figure 46, is one method that can be used. The rescuer's hand should grasp the victim's collar with the victim's head resting on the rescuer's arm for protection.

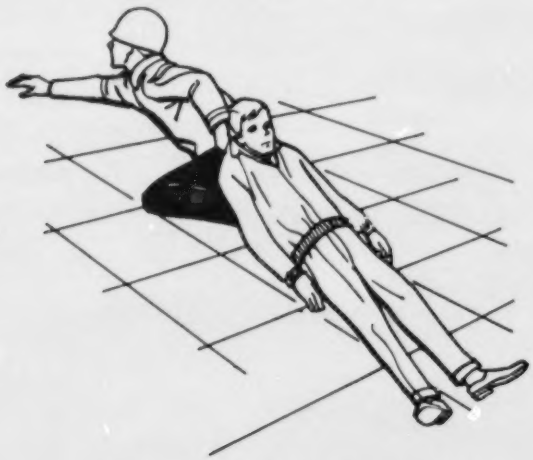


Figure 46. Clothes drag

Firefighter's Drag—In making a fire fighter's drag, the victim's wrists are tied together with a square knot as shown in Figure 47.

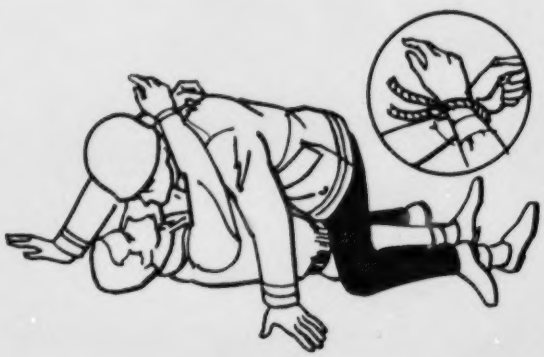


Figure 47. Firefighter's drag

The rescuer then straddles the victim. The EMT's head then passes between the victim's arms, and the victim's head and shoulders are raised just enough off the floor. By crawling, the EMT drags the victim out.

For descending a stairway when using the firefighter's drag, the rescuer's position is reversed, and the rescuer descends the stairs backward. This prevents the victim's head from hitting the steps.

The Blanket Drag—The blanket drag can be used in place of the clothes drag when the victim is nude or the clothing being worn is too flimsy to be used to drag the victim onto the blanket. The victim then can be removed to safety as shown in Figure 48.

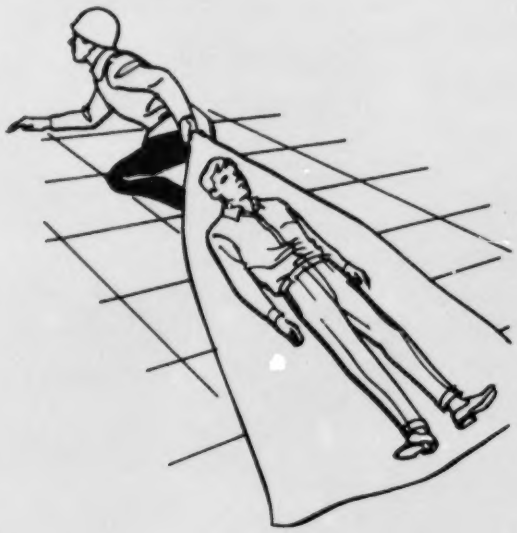


Figure 48. Blanket drag

FRACTURES

OBJECTIVES

Upon completion of the following chapter, you will be able to:
—describe how to evaluate the necessity for and techniques used in immobilizing possible fractures.
—describe the various types of splinting materials.

Following instruction and/or practice, you will be able to:
—examine a victim for a possible fracture.
—select and apply a splint to immobilize a fracture.

INTRODUCTION

Fractures are a common insult suffered by many trauma victims. Unfortunately, proper emergency care and/or immobilization of suspected fractures are found to be the most neglected areas of emergency victim care. Many victims have sustained permanent physical disabilities due to poor or no immobilization of a broken bone. It is essential, therefore, the EMT examine a victim thoroughly for any suspected fracture and apply the required splinting for the safety and well-being of the victim.

DEFINITION

A fracture is any break in the continuity of a bone. The break may be incomplete with only a line in the bone or completely crushed with related tissue damage.

TYPES OF FRACTURES

All fractures are classified as either simple (closed) or compound (open).

A closed or simple fracture is one in which there is no connection between the broken bone and the body's outer surface. The skin in the area of the fracture is not broken and wounds are not present.

An open or compound fracture is one in which the fracture is in communication with the outer surface of the body. The skin is torn or broken by the same force that has broken the bone or by the force causing the bone to pierce the skin. Open fractures can also be caused by gunshot wounds piercing the skin and breaking the bone or by other penetrating materials. In emergency care, any skin injury near a broken bone should be treated as an open fracture. Great care must be taken to treat all suspected open fractures; bacteria can enter the wound from many sources, extend to the bone, and cause an infection. Infected bones heal very slowly resulting in a delayed repair process and the possibility of occasional loss of a limb, if not life itself.

ADDITIONAL SUBDIVISIONS OF SIMPLE OR COMPOUND FRACTURES

An **impacted fracture** is one in which the bone is broken and one end is forcibly driven into the interior of the other.

A **complicated fracture** is one in which other structures or organs such as nerves, blood vessels, lungs, or bladder are damaged by force or by fracture fragments, such as a broken rib puncturing a lung.

A **greenstick fracture** (sometimes referred to as incomplete fracture) is one in which a bone bends and merely cracks without a loss of continuity and with little or no displacement. This type, similar to the breaking or bending

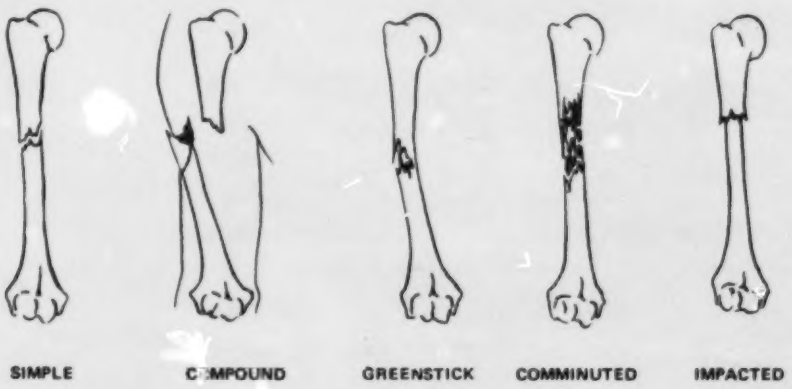


Figure 1. Types of fractures and subdivisions

of a greenstick from a tree, is very common in children whose bones are pliable.

A **comminuted fracture** is one in which the bone is broken into many pieces. The bone has several breaks and may be crushed and splintered. See Figure 1.

GENERAL SIGNS AND SYMPTOMS

The following are signs and symptoms of fractures. Not all of the listed signs and symptoms will be present in every fracture, but the presence of any should confirm the possibility of a fracture. The EMT will act accordingly. The nature of the accident and the location of the victim are additional points to consider.

Pain is usually severe at the fracture site. Pain and tenderness can be relieved by splinting, but will return with any movement or undue aggravation.

Loss of Motion may be the result of many things. Movement is not possible because muscle function is dependent upon the bones to which the muscles are attached. The fracture may be near a joint which would limit motion or the victim makes no attempt to move the part because of the severe pain.

Deformity is present in most complete fractures. There will be varying degrees of displacement, and this can be felt by gently running the fingers along the bone. In the most severe accidents, the limb may be totally misdirected with obvious angulation. Comparison of corresponding body parts may indicate an unnatural position. Overlapping of the broken ends of a bone may present a shortening of a limb.

Swelling and discoloration may occur immediately if excessive bleeding is present or it may not occur until later. (Take the victim's blood pressure before and after splinting. A falling blood pressure may be an indication of internal bleeding around the fracture site.) Swelling, in many cases, is nature's way of protecting the tissues surrounding the sharp ends of the broken bone; lymph and tissue fluids gather around the area and assist in forming a natural cushion. However, swelling due to the buildup of lymph and tissue fluids indicates damage to the soft tissue.

Grating sensations (crepitus) may be felt when examining the victim or the EMT may hear a grating sound. The broken ends of the bone rub against each other giving off the grating sensation or sound. Never create this grating intentionally, for it may increase the damage to the bone ends and its surrounding soft tissue.

ESSENTIAL POINTS IN THE EMERGENCY CARE OF FRACTURES

1. **Do not move the victim until fractures are immobilized.** The only exception would be if the victim is in immediate danger

of fire, explosion, cave-in, etc.; then the victim should be dragged in line with the long axis of the body.

2. For open fractures, control the bleeding and cover the wound with a sterile dressing before applying splints. Open fractures with protruding bones must be handled carefully to prevent exposed bone from slipping back into envelopes of the skin.

3. Straighten all fractures of the long bones to as near a normal position as possible before splinting, using slight traction. (Check with medical advisor.)

4. **Do not** straighten suspected fractures of the knee, elbow, wrist or ankle.

5. Immobilize all fractures above and beyond the adjacent joints.

6. Apply slight traction while splinting and maintain traction until the splint is securely in place.

7. Splints are to be applied snugly but not so tight as to interfere with circulation. Pad all splints and add additional padding to deformities.

8. Suspect neck and back injuries in any accident that could cause fractures.

9. Treat for shock.

10. Regardless of distance or travel time from the accident scene to the hospital, **all fractures must be immobilized.**

11. Transport carefully and comfortably to prevent aggravation of the injured part.

12. Take blood pressure before and after splinting.

Proper emergency care for fractures will prevent further injury to muscles, nerves, and blood vessels; prevent simple fractures from becoming compounded; relieve possible pressure on blood vessels and nerves; reduce bleeding, pain, and shock.

IMMOBILIZATION EQUIPMENT AND MATERIAL

SPLINTS — DEFINITION AND PURPOSE

A splint is a rigid support for a fractured or injured extremity or other part of the body. Its purpose is to prevent movement of the broken or injured part.

Commercial splints are made from metal, wood, and plastic. Improvised splints can be made from a variety of material. Some that may be used are pillows, blankets, cardboard, magazines, or the natural splint, tying one leg to the other or one finger to the other. All splints must be well padded, with attention to bony or tender areas as the knee, ankle, elbow and shoulder; and to depressions such as the groin and underarm.

Splints are held in place by roller bandages, cravats, and sometimes adhesive tape. Elastic bandages are not recommended for applying splints. Because of the elastic properties, it is possible to inadvertently apply splints too tightly.

If a splint is improperly padded or applied too tightly, pressure will cause swelling and pain with injury to tissues, possibly resulting in permanent damage.

TYPES OF SPLINTS

There are many types of splints used in the emergency medical service. Some are manufactured for commercial distribution, others are made by local EMTs; and still many others are adapted from improvised types used by your service. The essential points listed previously must be followed completely.

The most common types of splints and splinting material are cravat bandages, triangular bandages, board splints, traction splints, plastic inflatable splints, and blanket-roll splints.

Cravat bandages are used to secure rigid splints to the fractured part and immobilize fractures of the ribs, collarbone, lower jaw, shoulder blade, and some fractures of the upper arm (humerus). Cravats can be folded to produce a narrow, medium, or wide bandage for proper application to a particular fracture or size of the victim. They are used in conjunction with a sling for fractures of the collarbone, shoulder blade, and the upper arm.

Triangular bandages are used primarily as a sling to support a fractured or dislocated part.

Board splints must be constructed of material comparable to four-ply wood. For fractures of the thigh the splints must be four and one-half feet long and three inches wide. Boards three feet long by three inches wide are suitable for fractures of the leg. For fractures of the forearm, wrist and hand, boards measuring 15 inches by three inches are required. Splints made of cardboard, plastic, or slatted canvas may be used for fractures of the forearm and wrist. All splints must be well padded with a soft material. If improvised traction is to be applied with board splints, additional padding must be placed at those points of the body (the groin and the ankle) that will receive the greatest pressure.

Figure 2. Traction being maintained by one EMT as second EMT applies splint

Traction splints are required for treatment of lower extremity fractures, particularly those of the femur. The traction splint to be discussed in this text will be the "half-ring" traction splint. It is listed as essential equipment and is the traction splint being recommended by orthopedic surgeons throughout the nation.

The half-ring splint can be applied to either leg by manually reversing the padded half-ring at the top of the splint. To position the splint, one EMT applies gentle traction to the victim's leg, while the other EMT places the splint in position with the shorter side inside the leg and the longer side on the outside of the leg. The padded half-ring is slipped behind the leg at the knee, carefully advanced up the thigh until it is firmly in place against the ischium of the pelvis, where it is carefully secured with a strap over the front of the thigh. The shoe is left on and a pad is placed about the ankle. Use two cravats to make a hitch and a windlass to apply just enough traction to immobilize the leg. If conscious, the victim will usually let you know when it feels comfortable. The leg is then supported and tied to the splint with cravat bandages. See Figures 2 and 3.

The greatest danger in applying a traction splint is too much pressure being applied over the foot and ankle causing circulation to be cut off.

Commercial ankle hitches designed to minimize pressure on the ankle and foot are available. Local availability of the commercial hitch

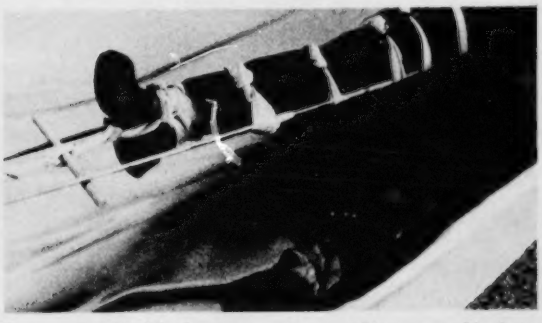


Figure 3. Half-ring traction splint applied to victim

should limit the use of cravat bandages and other improvised hitches.

Many emergency medical services have the newer type of traction splints. See Figure 4.

It is essential, however, that all EMTs be completely familiar with and proficient in applying the half-ring splint, even though their services use the newer types. The reason for this is that in a multiple victim accident the only type available might be the half-ring splint.

Many leading orthopedic surgeons have indicated that when traction has been properly applied there is:

—A marked decrease in the severity of shock

—Considerably less pain

—Less damage to surrounding tissues, blood vessels, and nerves

—A reduction in the length of disability

However, a fracture of a long bone that has been transported without traction results in added injury to blood vessels, muscles and nerves; and progresses to coagulation of the blood, the formation of clots, and total destruction of the surrounding cellular tissue.

Plastic inflatable splints are recommended only for fractures **at** or **below** the knee and **at** or **below** the elbow. The splint should not be put on over bare skin. Cover the limb with gauze or compresses to prevent possible skin irritation if the splint should be left on for an extended period.

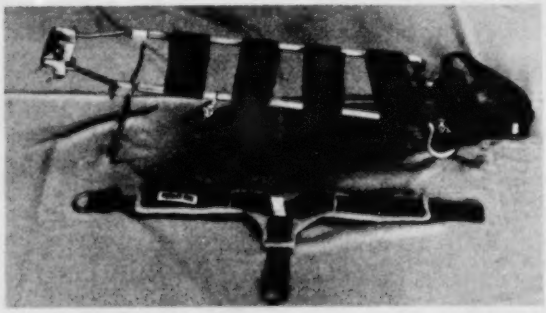


Figure 4. Newer type traction splint with ankle hitch

There are two common types of inflatable splints—one that has a zipper, and the other that must be "threaded" over the victim's arm or leg. Care must be taken with the zipper type. The mechanical problem of the zipper not operating freely may be overcome with proper inspection and maintenance. The threaded type has caused some problems primarily from improper application. The following method has proven to be the most effective.

The splint is threaded over the EMT's arm. The EMT then grasps the injured limb of the victim. The splint is then threaded over the victim's limb and inflated.

Inflatable splints can also be used to control bleeding and to cover burns. Sterile material is placed over the wound or burned area. The splint is applied carefully and inflated.

NOTE: Air splints are to be inflated by lung pressure only. A properly inflated splint can be slightly indented with the thumb.

BLANKET-ROLL SPLINTS

A blanket-roll is one of the commonly improvised splints. Figures 5 through 12 deal with making and applying blanket-roll splints.

Two sizes should be carried: a short roll (12″ to 16″) for possible neck fractures, and a long roll (22″ to 22″) for arm and leg fractures.

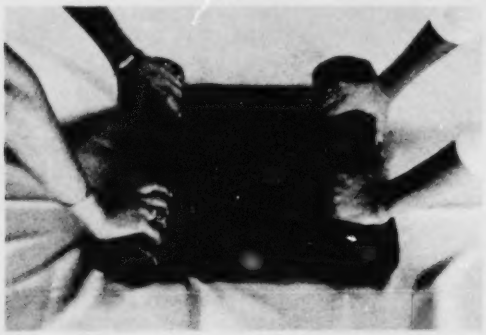


Figure 5

Figure 6

To make a blanket-roll splint, fold a blanket until it is 12″ to 16″ wide. Roll it from both ends toward the center, tucking all wrinkles under (Figure 5). Then tie it with three cravat bandages (Figure 6). When the splint is needed, the cravats will be immediately available.

Figure 7

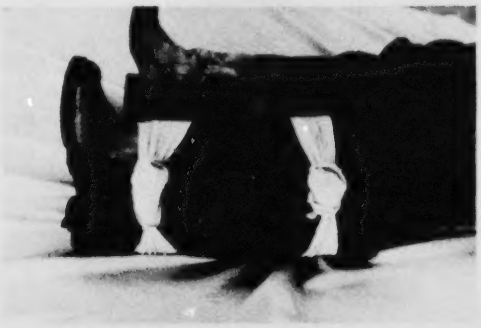


Figure 8

The long blanket-roll splint can be applied to the extremities. Figure 7 shows the proper supporting of a suspected fracture and the application of the splint. Figure 8 shows the splint in place.

Figure 9

Figure 10

Figure 9 shows the proper way to hold a head when a fracture of the neck is suspected. The EMT must be very careful not to hyper-extend the neck in a suspected or known neck injury. One EMT is preparing the short blanket-roll splint. Figure 10 shows how to place the blanket-roll splint gently under the victim's head. The rolls on each side of the head must be placed firmly on the victim's shoulder and next to the head.

Figure 11

Figure 12

The cravats are pushed under the blanket with a flat, thin blade (Figure 11). They can be brought down the splint from the top. Figure 12 shows the splint in place. It is positioned tightly against the victim's shoulders and head to immobilize the head and neck.

There is no such thing as a universal splint. No single splint is ideal for all fractures. The EMT must apply the proper splint and splinting material according to the nature and body location of the broken bone.

SPECIFIC FRACTURES — SIGNS, SYMPTOMS, AND CARE

SKULL FRACTURES

A fracture of the skull is a break in the bony structure forming the skull. The break may occur on the top, front, sides, or back of the head. All skull fractures are serious due to the possibility of a brain injury. Wounds may or may not be present. See Figure 13.

SIGNS AND SYMPTOMS

It is usually very difficult to determine the actual location of a skull fracture. However, when there is the slightest suspicion of a skull fracture, it should be treated as such. An injury of the head may or may not be visible. The victim is usually dazed and shows signs of faintness, dizziness, and progession into unconsciousness. Bleeding from the nose, mouth or ear(s) indicates fractures at the base of the skull. Pupils of unequal size indicate injury to the brain either by pressure or bleeding. Concussion of the brain may be confused with a skull fracture, but as the care for both is similar, there is no need to distinguish between them.

Figure 13. Fracture of the skull

EMERGENCY CARE

The EMT should keep the victim quiet and lying down with the head slightly elevated. If the location of the fracture is known, the victim's head should be positioned to rest away from the fracture site. If a wound is present, control the bleeding and apply a sterile dressing, being careful to avoid pressure on a "soft" spot or depression. This will prevent depressing bone fragments into the brain. Support with oxygen and maintain an open air passage. If there is excessive bleeding from the mouth or nose, the victim should be positioned to prevent aspiration of the blood. Bleeding from the ear should not be controlled except to loosely apply a sterile compress to absorb the flow. Keep the victim warm, give nothing by mouth, and transport to the hospital.

In cases of suspected head injuries, check for any changes in the victim's pupils. Tell hospital emergency room personnel about any changes. Many times a head injury will cause the tissue around one or both eyes to become blackened.

In looking for a decreasing level of consciousness, three important questions to ask and ask again are:

1. Who are you?
2. Where are you?
3. What day is it?

If the name of the victim is all the victim can recall, this is a sign of confusion and may mean the victim will get worse (loss of identity is usually the last thing the victim will lose). Confusion can be an indication of a blood clot and can build up in a matter of minutes to hours.

Be sure to tell the hospital emergency room personnel the level of consciousness of the victim upon arrival at the scene and any changes in the victim's condition.

Increasing confusion and a decreasing level of consciousness taking place rapidly may indicate an immediate need for surgery to save the victim. Information gathered at the scene

and en route to the hospital can be very helpful to hospital personnel.

If a victim has low blood pressure, the EMT should suspect other injuries in addition to head injuries. Head injuries themselves normally do not cause low blood pressure.

Occasionally, the victim of a head injury displays violent reactions. If so, the victim must be carefully restrained to prevent further injury.

NOTE: Remember, control bleeding but not drainage. Remember to suspect neck and back injuries of all victims with head injuries.

SPINE FRACTURES (NECK AND BACK)

All fractures of the neck and back are serious and all require prompt recognition and care. To prevent injury to the spinal cord and the nerves within, any injuries of the neck and back should be handled with caution. In any accident which could cause a fracture, EMTs must suspect and look for a spinal fracture, particularly if the victim is unconscious.

The EMT must be aware of what happens with a spinal injury. Basically a spinal injury will produce two problems.

1. Loss of motor control (partial or complete paralysis)

2. Loss of sensation (feeling)

Both loss of motor control and loss of sensation should be noted at the scene and this information given to hospital personnel. These levels can change. Changes should be noted and given to hospital personnel, as these changes may prove beneficial in treating the victim.

The EMT can test for these losses by asking the victim to try carefully to move one limb at a time (do not move fractures). This would be testing for motor loss. To test for sensory loss, the EMT should stick the extremities with a sharp object, starting at the farthest end and working up. Make a mark on the victim with the time the sensation was felt. Changes are very important to the hospital. If victim is unconscious on arrival (due to trauma), the EMT should suspect a head injury also unless proven otherwise.

The victim's condition can be checked by pain stimulus. Examples of this may be:

1. Pinching muscle over shoulder.

2. Applying skin pressure with hard object to legs.

3. Foot reflex. Drawing hard object from heel to toe on bottom of foot:
Normal—toes curl down.
Abnormal—toes curl up. This is a bad sign.

4. Knuckle pressure to sternum.

If no reaction to pain stimuli is present, the EMT should consider severe spinal injury.

The way spinal injury victims are handled may make the difference between complete recovery, permanent disability, and death.

NECK FRACTURES

The neck (cervical spine) is a common location of injuries to the spinal column. Automobile accidents and falls are the most frequent causes of neck injuries that may range from the so-called "whiplash" to complete severence of the spinal cord.

SIGNS AND SYMPTOMS

The cause of the accident and the position of the victim may provide sufficient evidence to the EMT of a neck injury. The victim will complain of pain at the fracture site, and numbness or tingling, or there may be complete paralysis from the point of the fracture on down. Breathing will be impaired, and the contents of the bowel and bladder may be expelled. Obvious deformities are rare.

EMERGENCY CARE

In treating a neck injury, the head, neck, and trunk must be kept straight, with slight traction applied to the head to prevent any motion. The EMT must use extreme care when using traction for neck injuries—it is only slight traction, and the neck should **not be hyper-extended.** If lying on the ground, the victim must be logrolled onto a backboard, maintaining the traction, and keeping the "nose" in line with the "belly button" during the logrolling. Maintain traction until the neck is immobilized completely. The use of a cervical collar, blanket-roll splint, sandbags, or similar material should be used to prevent motion. See Figure 14. The victim may be transported lying flat on the back. The victim can be, however, transported on the side, with proper immobilization, to facilitate the flow of fluids or vomitus.

Victims of automobile accidents with suspected neck fractures can be immobilized prior to extrication with the half-board.

Figure 14. Immobilization for fracture of the neck

BACK FRACTURES (THORACIC AND LUMBAR REGIONS)

The causes and symptoms of a broken back are the same as those for a broken neck, but paralysis from the back fracture usually does not affect the arms. As was previously indicated, paralysis will occur from the fracture site down. See Figure 15.

EMERGENCY CARE

The care for a broken back is the same as for a broken neck. Even though neck traction is not necessary, the neck must be supported during the logrolling procedure.

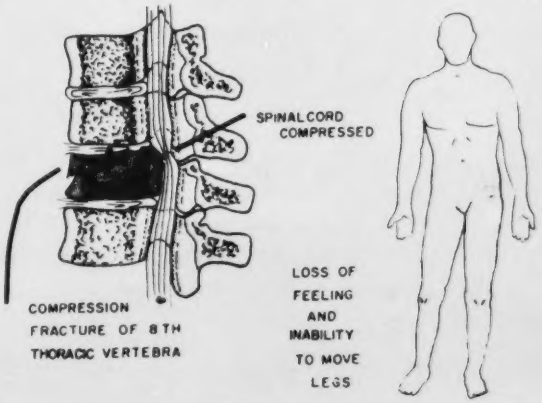


Figure 15. Complication of fracture of spine

PELVIC FRACTURES

Most pelvic fractures result from automobile accidents; falls and accidents that produce a squeezing or crushing force cause the others.

Pelvic fractures must be considered dangerous because many associated injuries may be present. The sharp bone fragments may have pierced the bladder, intestines or other internal organs.

SIGNS AND SYMPTOMS

With a pelvic injury the victim will be in shock resulting from severe pain and internal bleeding from damaged blood vessels and other internal organs. The victim will be unable to use the lower extremities due to the pain and muscle spasms. Pelvic fractures vary. Some may cause only pain and some exhibit a marked deformity with severe internal damage.

EMERGENCY CARE

A pelvic fracture requires careful, gentle treatment from the time of the initial examination throughout transport. The knees and ankles should be bandaged together, with a pad placed between the thighs. The knees may be kept straight or partially bent, whichever is more comfortable for the victim. If bent, padding should be placed under the knees. Wrapping of the pelvis with a wide cravat bandage and suitable padding will add to the victim's comfort, **but this must be done without rolling the victim.** See Figure 16A.

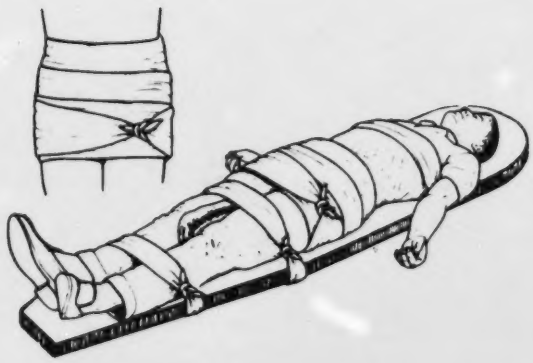


Figure 16A. Improvised splinting of a pelvic fracture using one or more cravats, depending upon the size of the victim

Figure 16B. Hand position shown above the victim

Figure 16C. Victim being lifted by four EMTs only high enough to slide backboard underneath.

Place the victim on a backboard. Lift the victim with preferably at least four people. Lift only high enough to slide the board under the victim. See Figure 16C. Rolling is not indicated due to the possibility of causing additional damage to the internal organs. Secure the victim to the board, treat for shock, and transport carefully to avoid situations and motions that may aggravate the victim's condition.

NOSE FRACTURES

A fracture of the nose is a common injury that results from a direct blow. It is not difficult to detect due to a marked deformity.

SIGNS AND SYMPTOMS

Such a fracture may be simple or compound. There is usually considerable deformity, severe pain, bleeding, and swelling. A grating sensation (crepitus) can usually be felt by the EMT.

EMERGENCY CARE

The immediate application of cold compresses will help to reduce the swelling, bleeding and pain involved in a nose fracture. If a splint is necessary, it can be made by using two small rolls of narrow bandage, one on either side of the nose, and held in place with strips of adhesive tape. See Figure 17.

Figure 17. Fracture of the nose

UPPER JAW OR CHEEKBONE FRACTURES

In fractures of the upper jaw or cheekbone, where there are open wounds, treat as for wounds of the face. No dressing is required in the absence of open wounds. Excessive bleeding will require measures to insure the maintenance of an open airway. Transport to the hospital, for the victim may require both medical and dental care.

LOWER JAW FRACTURES

A broken lower jaw is usually the result of a direct blow and occurs much more frequently than a fracture of the upper jaw.

SIGNS AND SYMPTOMS

This type of fracture is easily identified. The victim has difficulty in speaking and exhibits severe pain if efforts are made to open or close the mouth. The teeth are uneven, with some possibly loosened or knocked out. Bleeding from the mouth is common, originating about the gums near the fracture site. An obvious deformity and/or swelling may be present.

Figure 18. Bandage for a fractured jaw

EMERGENCY CARE

The application of cold compresses may reduce the swelling and pain involved in a jaw injury. The jaw must be immobilized by having the victim close the mouth (as much as possible depending on the degree of deformity), and applying a four-tailed bandage (see Figure 18).

RIB FRACTURES

CAUSE AND SIGNS AND SYMPTOMS

Rib fractures are usually the result of a direct blow to the rib cage. Severe pain when breathing, bending or twisting the body is a common symptom. There is tenderness at the fracture site and usually little displacement or deformity. If a lung has been punctured, the victim may cough up bright red frothy blood.

Figure 19. Applying cravat bandages for fractured ribs

EMERGENCY CARE

Immobilization of a rib fracture consists of applying three wide cravats to cover the entire rib cage on the injured side. The first cravat is applied to the lowest part of the rib cage, the second cravat should overlap the first about one-third, the third overlapping the second and extending to the armpit. See Figure 19. A pad is placed on the opposite side of the body under the knots which have been tied loosely in place.

The victim is asked to exhale. Upon each exhalation, each knot is tightened. Correctly applied, this method of immobilization will provide immediate relief of pain.

A broad binder or adhesive strapping may also be used to immobilize rib fractures.

If a lung has been punctured, maintain an open airway, aspirate fluids and transport.

COLLARBONE FRACTURE (CLAVICLE)

CAUSE AND SIGNS AND SYMPTOMS

A fracture of the clavicle is usually the result of falling on an outstretched hand with the force being transmitted to the shoulder.

The shoulder on the injured side will droop somewhat downward and forward. Because the clavicle lies immediately under the skin, a deformity may be seen. As in other fractures, the victim may experience pain and tenderness. The EMT may feel a grating sensation. Although a rare complication, fragments of the bone may injure the blood vessels to the arm which pass close beneath the clavicle.

EMERGENCY CARE

Immobilization to hold the shoulders up and back can be accomplished by applying a figure eight bandage. The bandage should be firm and padding should be placed over the shoulder and at the armpits to prevent discomfort. See Figure 20. Another method is to place the arm, on the injured side, in a sling. Then secure the arm and sling to the body with a wide cravat bandage.

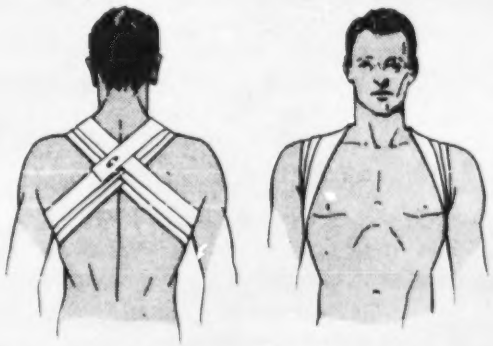


Fig 20. Bandage for fractured clavicle

SHOULDER BLADE FRACTURES (SCAPULA)

CAUSE AND SIGNS AND SYMPTOMS

Fractures of the scapula are not common. They are caused by a direct blow over the shoulder blade and generally result in a simple fracture with little displacement. There is usually pain at the fracture site, swelling, and the inability to swing the arm.

EMERGENCY CARE

Place the arm, on the injured side, in a sling, then secure the arm and sling to the body with a wide cravat bandage.

UPPER ARM FRACTURES (HUMERUS)

CAUSE AND SIGNS AND SYMPTOMS

Fractures of the humerus result from a variety of accidents. They may often be complicated because of the nerves and blood vessels that lie close to the bone. The usual symptoms are pain, swelling, deformity and loss of motion. See Figure 21.

EMERGENCY CARE

This is a difficult fracture to immobilize. The injured arm should be secured to the body with a wide cravat bandage.

The arm is then placed in a sling. A short board splint applied to the outer side of the arm may be used in conjunction with the above procedure. If the arm is straight and the elbow cannot be bent, long board splints may be applied.

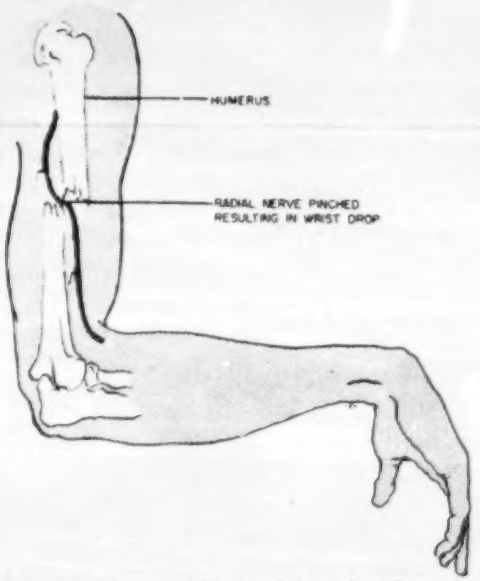


Figure 21. Nerve injury with wrist drop in fracture of humerus

ELBOW FRACTURES

CAUSE AND SIGNS AND SYMPTOMS

An elbow fracture usually results from a fall or a direct blow to the elbow. Pain, deformity, swelling, grating sensation, and loss of motion may be present.

EMERGENCY CARE

Fractures of the elbow are to be **immobilized in the position found.** If found straight, splint them straight; if found bent, splint them bent. If the arm is found straight, a full board splint or a full arm plastic splint may be used. If the arm is found bent, an L-shaped splint having the angle of the arm's position can be prepared by tying two short board splints together. The splinted arm is then placed in a sling.

The EMT should not attempt to align a suspected elbow fracture.

LOWER ARM FRACTURES (RADIUS AND ULNA)

CAUSE AND SIGNS AND SYMPTOMS

When both bones of the forearm are broken, all the usual signs of a fracture are present. When only one of the bones is broken, the other acts as a splint and there is pain, little deformity, and sometimes inability to use the arm.

EMERGENCY CARE

Immobilization of this fracture can be accomplished by using padded board splints, inflatable splints, or even magazines. It should be splinted in the most comfortable position.

WRIST AND HAND FRACTURES

CAUSE AND SIGNS AND SYMPTOMS

The wrist is usually broken by a fall on the outstretched hand. The bones of the hand and fingers are fractured as a result of direct blows. The most common wrist fracture is the "Colles'" fracture shown in Figure 22. There is pain, tenderness, and swelling with some deformity. The knuckles of broken fingers appear larger than the knuckles of corresponding fingers.

Figure 22. Colles' fracture

EMERGENCY CARE

Immobilize the wrist by using padded board splints, inflatable splints or magazines. The hand can be immobilized using a short, wooden splint and padding to hold the hand in a cupped position. The use of a tongue blade and bandage is sufficient for a broken finger.

The EMT should not attempt to align a suspected wrist fracture.

HIP FRACTURES

CAUSE AND SIGNS AND SYMPTOMS

A broken hip is usually the result of a fall, and should be suspected of all victims who complain of pain in the hip following an injury. Hip fractures involve a large surface of bone that produces severe pain. The victim will be unable to lift the leg and due to bone displacement, circulation will be impaired. Generally, the affected leg and foot turns outward. Shock will accompany this injury.

EMERGENCY CARE

In fractures of the hip, as with other fractures, splinting must be accomplished before moving the victim. The victim should not be permitted to stand or sit up. A traction splint should be applied.

If a long board splint is used, it should be well padded and extend from the victim's feet to a point just below the shoulder. Treat for shock and transport the victim on a backboard.

THIGH FRACTURES (FEMUR)

CAUSE AND SIGNS AND SYMPTOMS

A thigh fracture is often the result of a fall or a direct force or blow to the thigh. In the elderly, a simple accident such as a misstep or slight fall may cause a fracture. When the break occurs, there is often considerable bleeding and soft tissue damage that produce shock. Severe pain, deformity, loss of motion, shortening, grating, and angulation are common symptoms associated with this fracture.

EMERGENCY CARE

The victim of a thigh fracture should be kept lying down, warm, and treated for shock. The leg should be placed in as near normal position as possible under slight traction. Traction must be maintained during immobilization to reduce pain and further tissue damage.

The splint of choice is the traction splint for a fractured thigh.

Figure 23. Traction splinting with Hare traction splint. The splint should be adjusted to be aproximately 10 to 12 inches longer than the uninjured leg. All straps should be opened.

Figure 23A. While traction is maintained, the ankle hitch is applied.

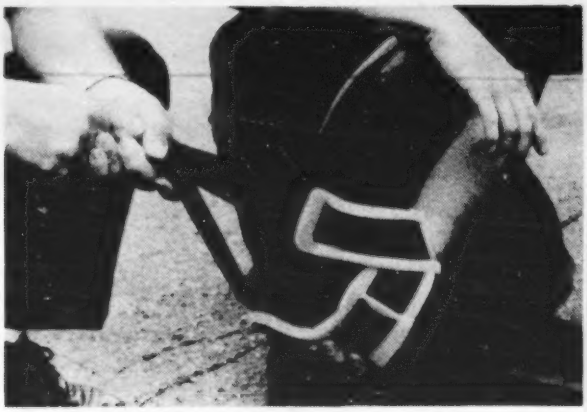


Figure 23B. Traction is transferred from the ankle to the ankle hitch.

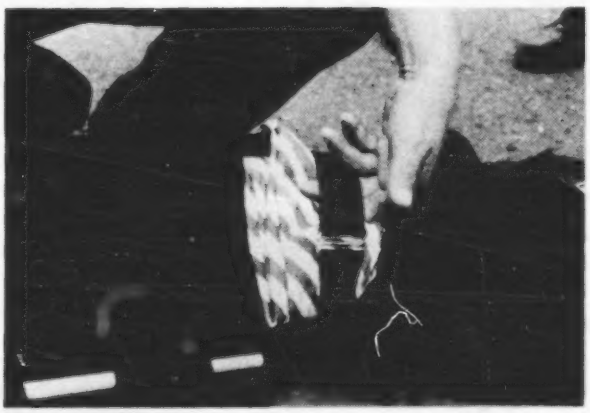


Figure 23C. The ischial strap is applied to the upper leg. The strap should be loose enough so that two fingers can be slipped under it. Note the pad under the strap.

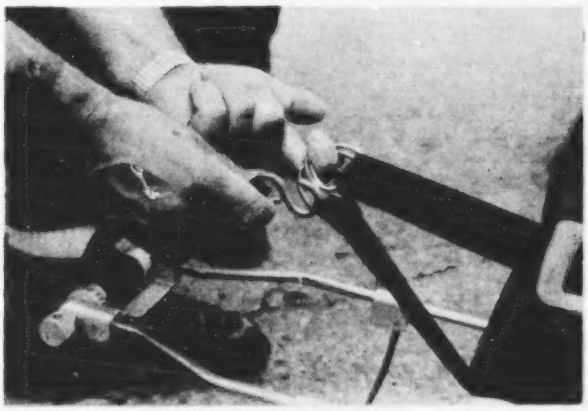


Figure 23D. The ankle hitch is attached to the splint. Note that the strap running under the heel is on the bottom of the three rings.

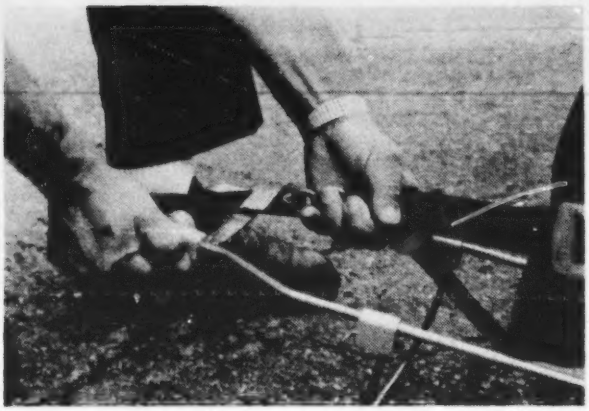


Figure 23E. Mechanical traction is applied by turning the knurled knob on the splint until it can no longer be turned.

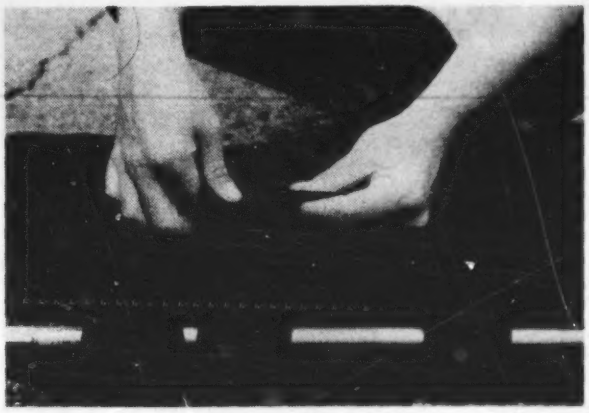


Figure 23F. The Velcro straps are applied from the top down. Be sure none of the straps are over the knee.

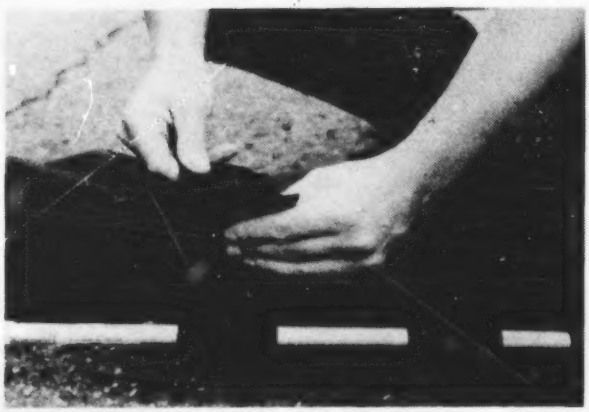


Figure 23G. Fasten the rest of the straps to the leg.

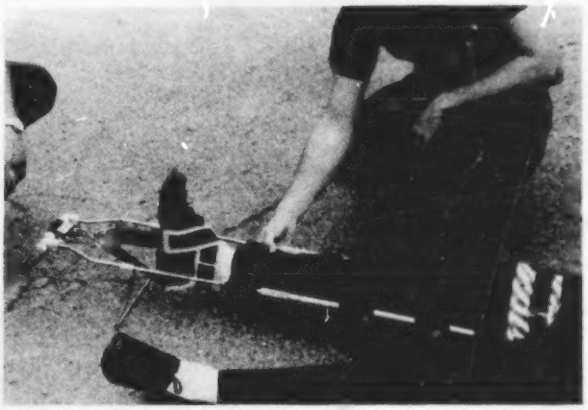
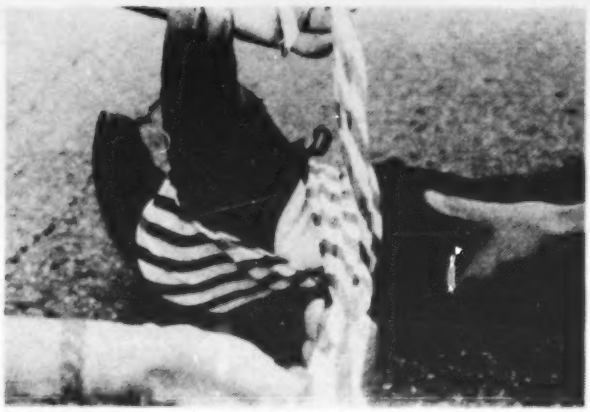


Figure 23H. Check the splint for tightness, fit and comfort before transporting the victim.

Figure 24. Traction splinting with Thomas half-ring



Figures 24A and B. Ankle hitch is applied with a cravat bandage. (Traction has been eliminated in these photos to better illustrate the application of the hitch.)

Figure 24C. A cravat bandage is slipped under the ankle hitch. The cravat will be used to apply traction.

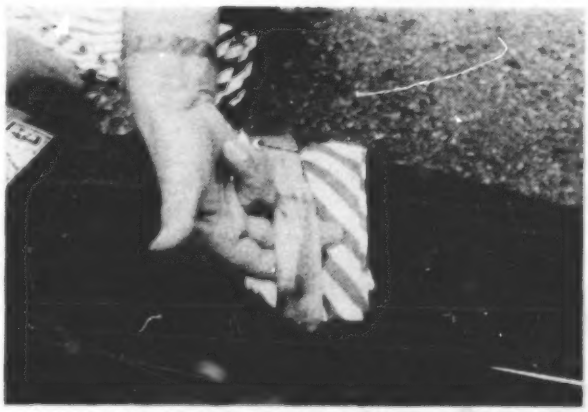


Figure 24D. The ischial strap is applied over the upper leg. The strap should be loose enough to allow two fingers to be slipped under the strap. Note the padding under the strap.

Figure 24E. While traction is maintained, cravat bandges are put into place.

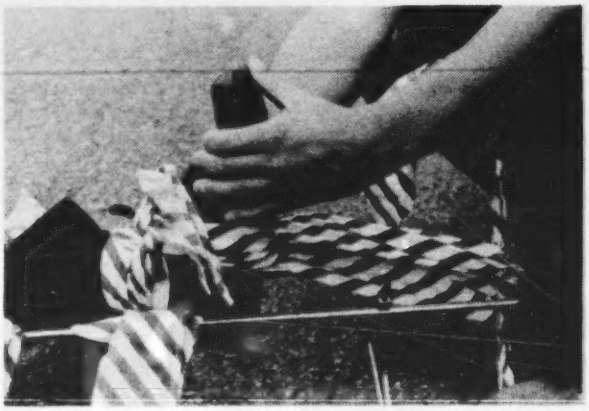


Figure 24F. The cravat under the ankle hitch is tied around the end of the splint.

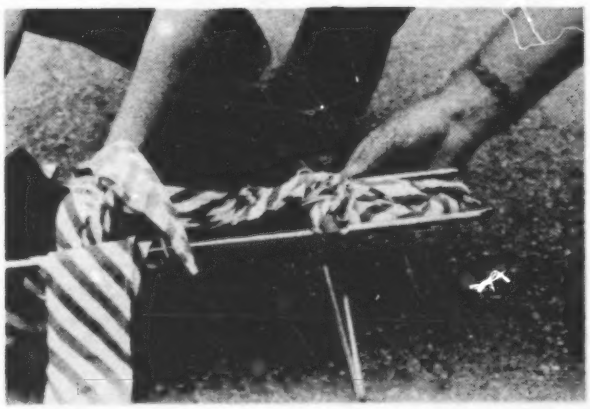


Figure 24G. A dowel rod is placed between the traction cravat and twisted until the traction on the leg is the same as that held by the EMT. The dowel rod is then tied into place so it does not slip.

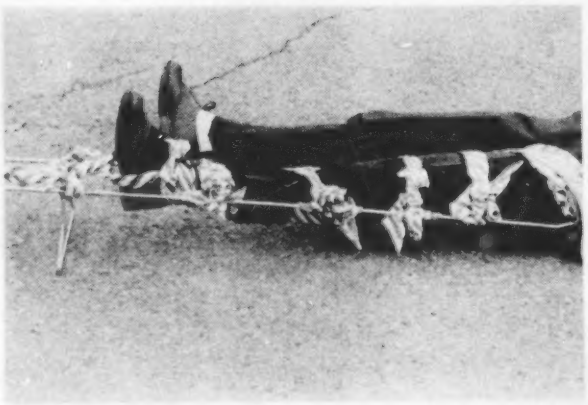


Figure 24H. The rest of the cravat bandages are then tied, which hold the splint to the leg. Note the positions of these cravat bandages.

KNEE FRACTURES

CAUSE AND SIGNS AND SYMPTOMS

Fractures of the knee and/or the kneecap (patella) occur frequently to victims of automobile accidents. Falls are probably the most common cause, and it is usually the kneecap that is fractured. In addition to the general symptoms of all fractures, the victim is unable to kick the leg forward, and if an attempt to walk is made, the injured leg will "drag."

EMERGENCY CARE

Fractures of the knee and knee area should be treated the same as fractures of the elbow. **No attempt should be made to straighten the limb** due to possible damage to blood vessels and nerves. However, if no pulse can be found below the fracture site, minimal straightening with slight traction may be attempted.

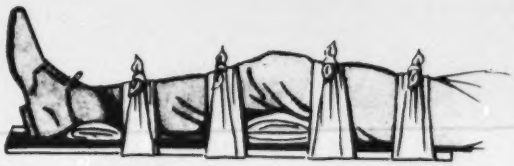


Figure 25. Immobilization for transportation

If the leg is found straight, a board or an inflatable full leg splint may be used. If the leg is found bent, an improvised splint conforming to the angulation must be applied. See Figure 25.

LOWER LEG FRACTURES (TIBIA AND FIBULA)

CAUSE AND SIGNS AND SYMPTOMS

Fractures of the lower leg result from a variety of accidents.

The tibia, or shinbone, is large and sturdy, and its entire length can be felt in the front of the leg. There is very little tissue in front of the tibia, and fractures of this bone are easily compounded. The fibula, which is smaller, lies on the outside section of the leg. The lower end of the fibula can be felt near the ankle.

When only one bone is broken the other acts as a splint; but if both bones are broken, there may be an obvious deformity at the fracture site. Pain, swelling, and grating will be present in fractures of either bone.

EMERGENCY CARE

To treat the victim of a lower leg fracture, align the leg to as near normal position as possible using slight traction. Maintain traction until a splint is applied. Immobilize with two padded board splints; one placed on the inside of the leg, the other on the outside, and both secured with cravat bandages or a full-leg inflatable splint. Inflatable splints provide excellent immobilization and will assist in bleeding control of open fractures.

Treat the victim for shock and transport comfortably to the hospital.

ANKLE FRACTURES

CAUSE AND SIGNS AND SYMPTOMS

The causes and symptoms of ankle fractures are similar to those of other fractures. It may be very difficult to distinguish a fractured ankle from a sprained ankle. Both will present swelling and pain and a marked disability.

EMERGENCY CARE

The ankle can be immobilized by using inflatable splints, board splints, or an improvised pillow splint.

A fracture-dislocation of the ankle with a marked deformity is a serious type of injury. To prevent damage to adjacent soft tissue, apply large dressings with slight pressure. A fracture-dislocation of the ankle should be immobilized in the position found. See Figure 26.

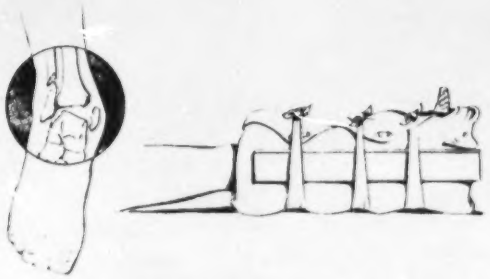


Figure 26. Potts fracture and immobilization

FOOT FRACTURES

CAUSE AND SIGNS AND SYMPTOMS

The foot includes the small bones below the ankle as well as those of the toes. Heavy objects falling on the foot is the main cause of foot fractures. Pain, swelling and deformity are the usual symptoms of this type of fracture.

EMERGENCY CARE

If the fracture is not compounded and swelling is not too great, do not remove the shoe. The shoe left in place will provide adequate immobilization. If the decision has been made to remove the shoe, extreme care must be taken so as not to cause further injury. Keep the foot elevated and immobilize with an inflatable splint or improvised pillow splint. A splint can be improvised from pillows by wrapping the pillow around and under the foot and securing it with two or more cravat bandages. Pin the overlapping pillow case under the foot.

Figure 27

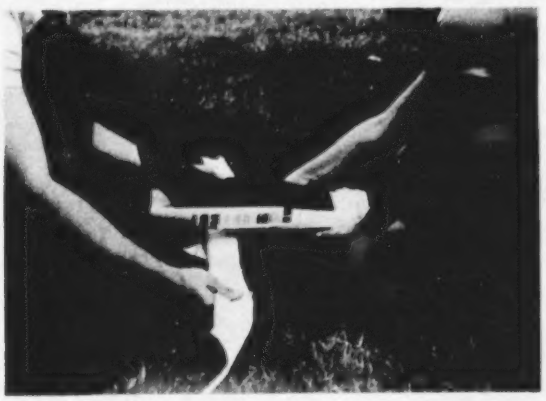


Figure 28

Improvised splints may be made from large magazines, interwoven as shown in Figure 27. An entire leg or arm could be immobilized this way and might require many magazines. Large magazines should be carried in all fracture kits. Figure 28 shows a magazine splint being applied. The knot is tied on one side, so as to make the splint as comfortable as possible for the victim. The splint runs above and below the joints adjacent to the fracture; in this case, the ankle and knee.

DISLOCATIONS

OBJECTIVES

Upon completion of the following chapter, you will be able to:
—explain causes, signs and symptoms for dislocations of upper or lower extremities.
—describe emergency treatment for dislocations of upper or lower extremities.

Following instruction and/or practice you will be able to:
—perform emergency treatment for dislocations of upper and lower extremities.

INTRODUCTION

Dislocations are a common type of traumatic injury seen by the EMT. It is important the EMT know how to properly care for this type of injury to decrease pain, shock and the possibility of further injury to muscles, ligaments and/or blood vessels.

DEFINITION

A dislocation is a condition that occurs when the bones forming a joint slip away from each other beyond their normal position. A dislocation is usually accompanied by tearing or stretching of ligaments, muscles and other soft tissue parts including blood vessels.

CAUSES

Dislocations are caused by falls or blows that apply a force in such a manner that the joint capsule is torn. The free-moving joints of the jaw, shoulder, elbow, wrist, fingers, hips, knee, ankle, and the toes are the joints most often dislocated.

SIGNS AND SYMPTOMS (GENERAL)

The major symptoms of dislocations are:

1. Pain, which often may be severe.

2. Deformity of a joint with an obvious difference when compared with the unaffected joint.

3. Loss of motion, partially or completely locked.

4. Swelling, which usually occurs rapidly.

5. Discoloration.

6. Shortening or lengthening of an extremity.

EMERGENCY CARE (GENERAL)

Dislocations are best treated by supporting the dislocated area using slings, bandages, splints and other material that will immobilize and offer the greatest degree of comfort. **No attempt should be made to straighten the part.** It must be immobilized in line with the existing deformity. Shock is usually present in all dislocations. So, the EMT should treat the victim for this condition and transport to a hospital, avoiding any action that may aggravate the condition.

The EMT should make no attempt to reduce a dislocation. Improper manipulation can cause additional injury and damage to the ligaments, muscles, blood vessels and other soft tissues.

DISLOCATION OF THE SHOULDER

CAUSE AND SIGNS AND SYMPTOMS

The shoulder is usually dislocated by falls or blows to the shoulder or by falls causing the victim to land on the hands or elbows. With the arm held rigid, the elbow will stand off one or two inches from the body. The shoulder appears flat and there is a depression beneath the point of the shoulder. Swelling will occur and pain is severe.

EMERGENCY CARE

When dealing with a dislocated shoulder, support the arm and place a pad about four inches wide and two or three inches thick beneath the arm, extending from the armpit to the elbow. Place the center of a cravat bandage on the outside of the arm just above the elbow. Carry both ends around the body and tie on the opposite side over a pad. Place the arm in a triangular bandage sling. Treat for shock.

DISLOCATION OF THE ELBOW

CAUSE AND SIGNS AND SYMPTOMS

The elbow is dislocated as a result of a direct force or blow at the joint and occasionally by a fall on the hand. There is usually a marked deformity, great pain, and the victim is unable to bend the arm at the joint.

EMERGENCY CARE

Dislocations of the elbow may be found in many positions. Make no attempt to straighten the limb. Splint the limb in the position found and pad it well to conform to the deformity. Due to severe pain, the treatment for shock may be indicated.

DISLOCATION OF THE WRIST

CAUSE AND SIGNS AND SYMPTOMS

Dislocations of the wrist are not very common, but when they occur it is usually the result of the hand being extended to break a fall. It is difficult to distinguish between a dislocated and fractured wrist.

EMERGENCY CARE

Treat this dislocation as a suspected fracture. Immobilize, pad all deformities, and transport.

DISLOCATION OF A FINGER OR TOE

CAUSE AND SIGNS AND SYMPTOMS

A finger or toe may be dislocated as the result of a fall or direct blow. The usual symptoms of a dislocated digit are shortening, deformity, pain, swelling and/or the inability to bend the finger or toe at the dislocated area.

EMERGENCY CARE

It is recommended the dislocated finger or toe be protected with padding, splinted and supported in a comfortable position. Dislocations of the thumb may require surgical reduction due to the thumb's complicated structure.

DISLOCATIONS OF THE HIP

CAUSE AND SIGNS AND SYMPTOMS

Dislocations of the hip are the result of falls or force to the foot or knee, or by a direct blow to the thigh. Great force is required to cause a hip dislocation and fractures usually accompany this condition. There is severe pain, rigidity, loss of motion, and an obvious abnormal position of the leg. The hip may be dislocated in a forward or backward position, depending on the force directing the movement of the head of the thigh bone (femur). A backward dislocation is the most common with the foot turned inward and the thigh drawn toward the opposite leg. In a forward dislocation, the thigh is somewhat flexed and held outward; the foot is also turned outward.

EMERGENCY CARE

A victim of a dislocated hip should be log-rolled or carefully supported and lifted onto a backboard. If the circumstances necessitate lifting, raise the victim only high enough to slide the backboard under the body. Make a pad of blankets or other similar material large enough to support the leg in the line of the deformity. Immobilize by securing the victim to the board with straps or cravats. Keep the victim comfortable, reassure, and treat for shock. Transport very carefully to minimize movement and prevent further aggravation. See Figure 1.

Figure 1. A method of immobilizing a dislocated hip

DISLOCATION OF THE KNEE OR KNEECAP

CAUSE AND SIGNS AND SYMPTOMS

Dislocations of the knee or the kneecap result from direct force applied at the knee, or from a fall on the knee. There are signs of deformity, severe pain, and the inability to use the knee.

EMERGENCY CARE

To treat a victim with a dislocated kneecap, support the dislocation in the position found and apply a fixation splint (which must extend past the hip and past the ankle) and a pad to conform to the deformity.

DISLOCATION OF THE ANKLE

CAUSE AND SIGNS AND SYMPTOMS

Dislocation of the ankle will show a marked deformity at the joint. Swelling is rapid. There is usually an accompanying fracture.

EMERGENCY CARE

Treating a dislocated ankle consists of supporting the dislocation and applying a splint as for a fracture of the ankle. Treat the victim for shock and transport.

Available EMS Publications

For ordering and pricing information contact:
Vocational Instructional Materials Laboratory
The Ohio State University
154 W. Twelfth Avenue
Columbus, Ohio 43210
Phone (614) 422-5001

Emergency Victim Care—Student Manual (EVCM)
Emergency Victim Care—Instructor Manual (EVCIM)
Emergency Victim Care—Workbook (EVWB)
EMS Binder—2½" Three-ring binder (EMTB)
Advanced EMT Instructor Manual (EVAIM)
EMS Slide/Tape Series
—Bleeding Control — 42 slides (EMST-1)
—CPR — 72 slides (EMST-2)
—Extrication — 79 slides (EMST-3)
—Fractures — 139 slides (EMST-4)
—Moving and Handling — 111 slides (EMST-5)
—Proper Examination — 68 slides (EMST-6)
—Vital Signs — 28 slides (EMST-7)
—Wounds and Bandaging — 79 slides (EMST-8)
—Anatomy and Physiology (EMST-9)
Victim Rescue Manual—Student Manual
Victim Rescue Manual—Instructor Manual
River Rescue Manual—Student Manual
River Rescue Manual—Instructor Manual
Farm Accident Rescue Manual